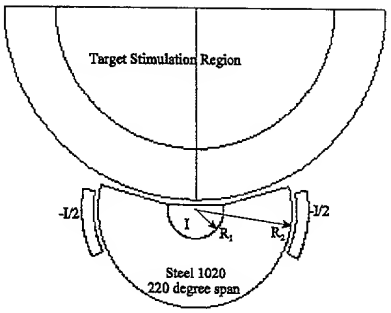

Target Stimulation Region
-l/2
l
R_1
R_2
l/2
Steel 1020
220 degree span

Fig. 1

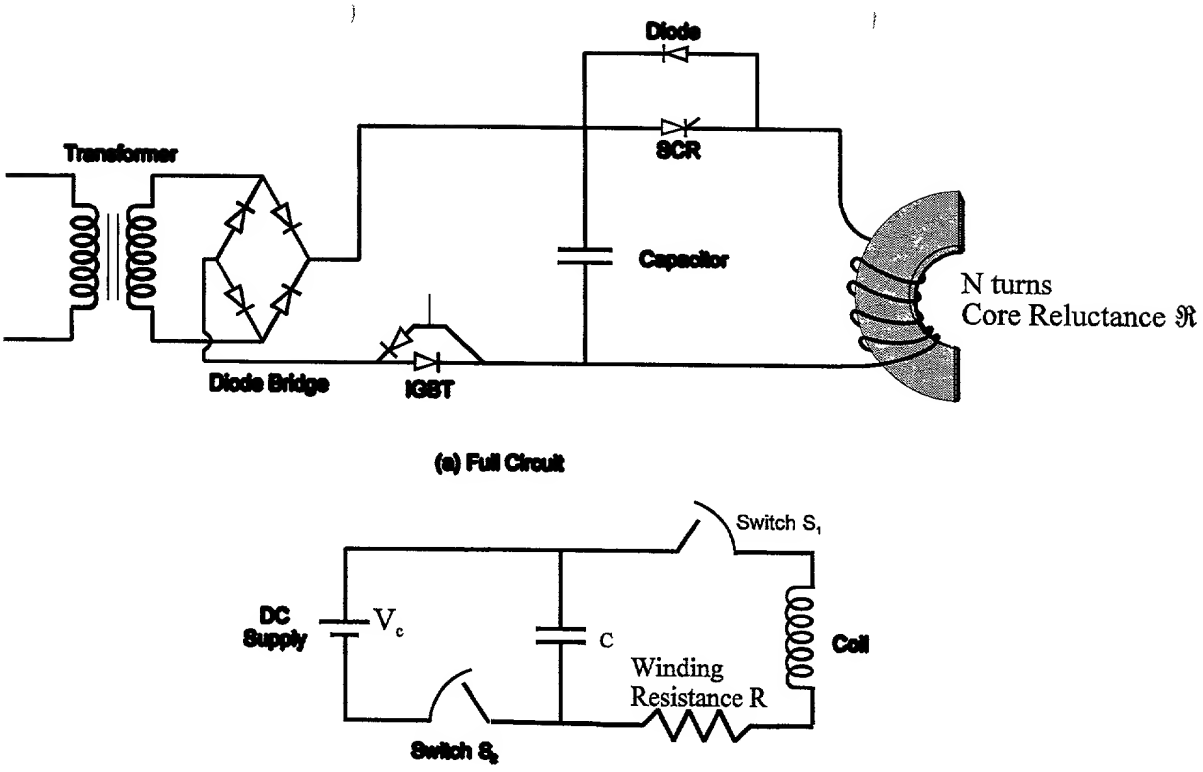
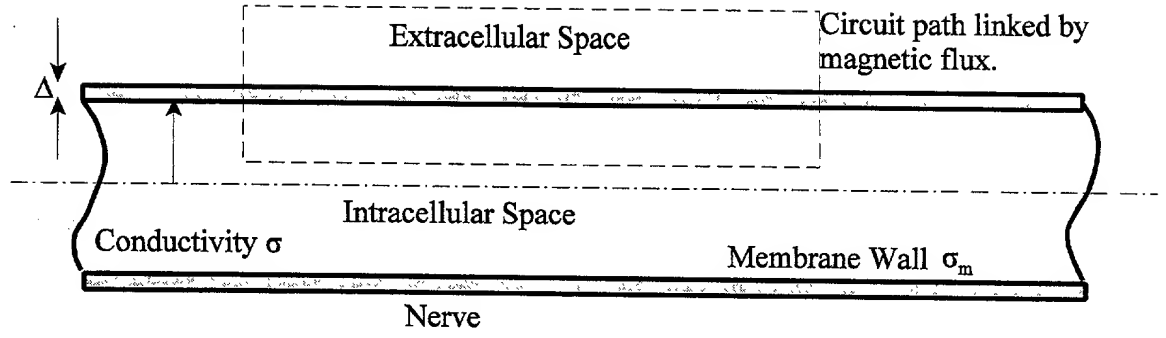


Fig. 2

Downloaded from http://www.tandfonline.com by 66.249.66.80 on 08/15/13


Extracellular Space
Circuit path linked by magnetic flux.
Δ
Intracellular Space
Conductivity σ
Membrane Wall σ_m
Nerve

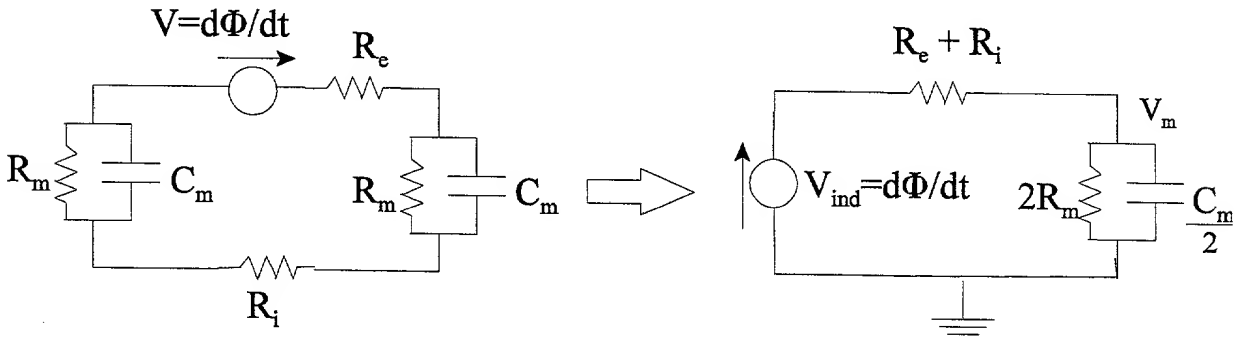
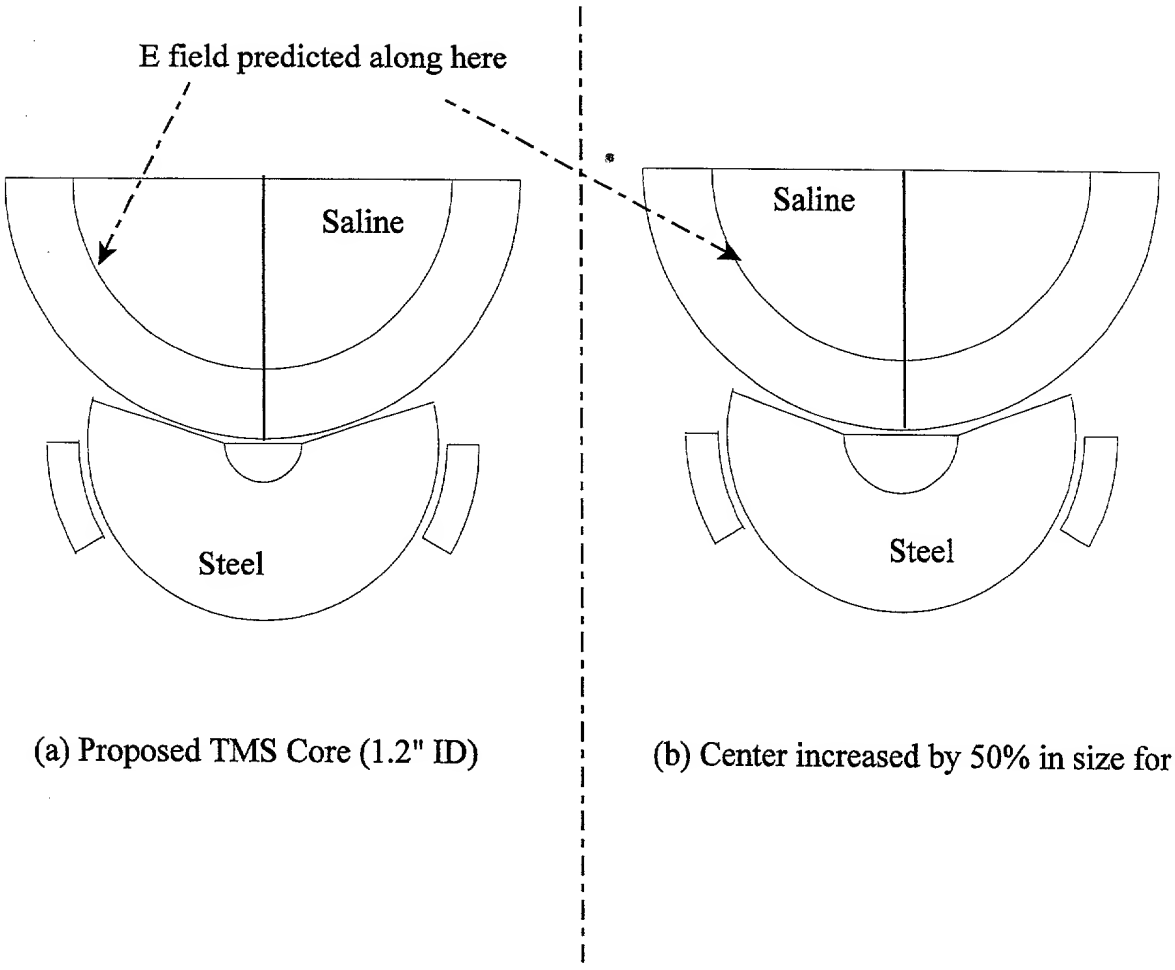

V=dΦ/dt
R_e
R_m
C_m
R_m
C_m
R_i
$R_e + R_i$
V_m
V_{ind}=dΦ/dt
$2R_m$
$\frac{C_m}{2}$

Fig. 3



(a) Proposed TMS Core (1.2" ID)

(b) Center increased by 50% in size for wire

Fig. 4

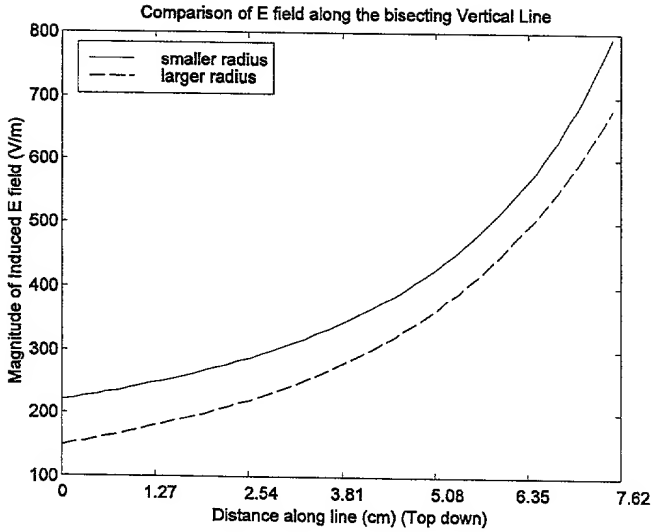

Comparison of E field along the bisecting Vertical Line
smaller radius
larger radius
Magnitude of Induced E field (V/m)
800
700
600
500
400
300
200
100
0
1.27
2.54
3.81
5.08
6.35
7.62
Distance along line (cm) (Top down)

Fig. 5

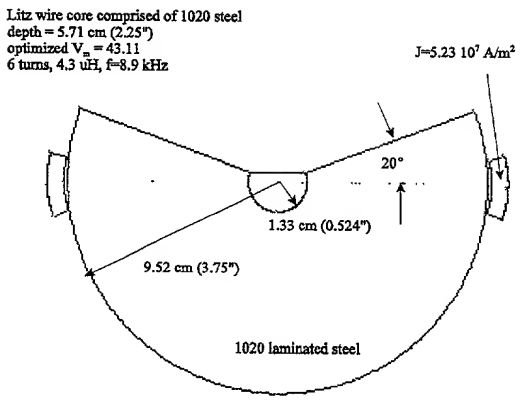

Litz wire core comprised of 1020 steel
depth = 5.71 cm (2.25")
optimized V_m = 43.11
6 turns, 4.3 uH, f=8.9 kHz
J=5.23 10^7 A/m^2
20°
1.33 cm (0.524")
9.52 cm (3.75")
1020 laminated steel

Fig. 6

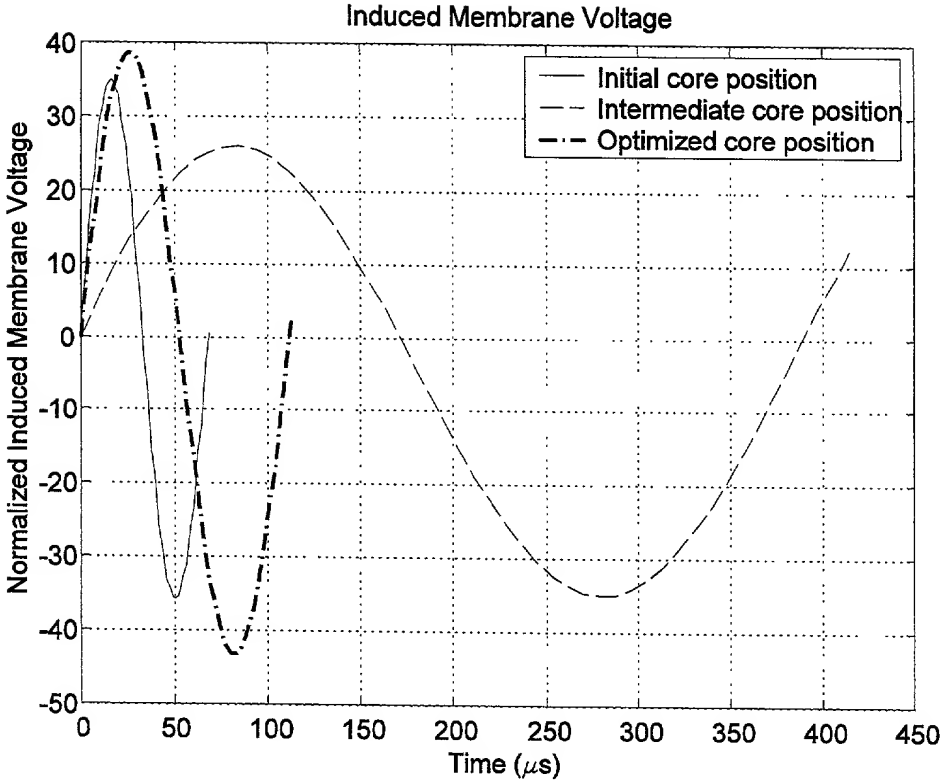

Induced Membrane Voltage
Initial core position
Intermediate core position
Optimized core position
Normalized Induced Membrane Voltage
Time (μs)
40
30
20
10
0
-10
-20
-30
-40
-50
0
50
100
150
200
250
300
350
400
450

Fig. 7